

Donn B. Cahill

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SPRUCE BUDWORM GROUND APPRAISAL
SURVEY PROCEDURES

By David McComb, Entomologist

Prepared By The
Forest Insect Laboratory
Missoula, Montana

SPRUCE BUDWORM GROUND APPRAISAL SURVEY PROCEDURES

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Forest insect appraisal surveys are made of epidemic infestations to determine the need for control. They are made as required on Federal, state, and private forest lands in Forest Service Region 1 by the Intermountain Forest and Range Experiment Station with the help, when necessary, of cooperating forest agencies, private timber corporations, or individuals. In appraising the severity and trend of current epidemic infestations of spruce budworm (Choristoneura fumiferana (Clem.)) in northern Idaho and Montana it is essential that uniform survey sampling procedures be employed to assure comparable appraisals of the many scattered infestations. Only in this way can the entomological need for applied control be properly assessed by the Station.

To foster uniform infestation appraisals, the following guidelines have been prepared describing procedures for the ground phases of budworm appraisal surveys and survey terminology. Further explanation of procedures or assistance in training the field personnel of Station survey cooperators may be had by contacting the Missoula Forest Insect Laboratory, U. S. Forest Service, Federal Building, Missoula, Montana (telephone Missoula 2-2131).

SURVEY PROCEDURES

1. The Station will assist survey cooperators in selecting locations of spruce budworm defoliation plots. The plots selected by the survey crew leader should be scattered throughout the infested area. Plots should be at least one mile apart. True firs and Douglas-fir will be the only tree species examined in the plots.
2. Data collected on each plot should be recorded on Missoula Forest Insect Laboratory Form S-57 attached.
3. Record the location and number of each plot on a half-inch scale map of the area.
4. Record the map number and plot number in the upper right-hand corner of the Form S-57.
5. Select five host type trees at random on the plot. Examine 20 new (1957) foliage growth tips on each tree, five each from four twigs, for evidence of budworm feeding.

6. Record in the checker-board squares opposite the 1957 column the amount of defoliation for each new growth tip. Place a figure 1 in the square if defoliation amount is between 1 and 33%, a figure 2 if defoliation is between 34 and 66%, a figure 3 for defoliation between 67 and 100%. If no defoliation is observed place a zero in the block.
7. Repeat this procedure for the 1956 foliage growth of the sample twigs. Record the amount of 1956 defoliation in the same manner as the 1957 defoliation, being sure the appropriate figures are placed in the columns opposite the symbol "1956".
8. On each of the five trees examined observe 1957 foliage for the presence or absence of needle cast fungus damage. If all five trees examined have some needle cast damage, place a check in the block marked "heavy" in the lower left corner of Form S-57. If none of the five trees examined have needle cast damage then place a check in the block marked "none". If some but not all of the trees have needle cast damage place a check in the "light" block.
9. From observation of all fir trees within a quarter-mile of the plot center, estimate the amount of foliage that has been removed by budworm feeding over the past five years. Check the appropriate percentage figure nearest to this estimate under "Past damage" on the form.
10. Observing all timber type within a quarter-mile of the plot center, estimate the percentage of the overstory trees which are true firs or Douglas-fir. Check the percentage figure nearest this estimate under "Host type" on the form.
11. Sign surveyor's name and the date of survey on the form.
12. Do not write in the five blocks in the lower right corner of Form S-57.
13. Return the completed Forms S-57 and the maps showing the plot locations to the Missoula Forest Insect Laboratory as soon as the survey of each area is completed.

IF&RES
Form S-57
MFIL

SPRUCE BUDWORM GROUND APPRAISAL SURVEY RECORD

Map No.

Plot No.

Defoliation Plot Data

Individual New Growth Tip Defoliation

TREE	YEAR	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL
1	1957																					
	1956																					
2	1957																					
	1956																					
3	1957																					
	1956																					
4	1957																					
	1956																					
5	1957																					
	1956																					
																	TOTAL 1957					
																	TOTAL 1956					

0 = No defoliation
1 = 1% to 33% defoliation
2 = 34% to 66% defoliation
3 = 67% to 100% defoliation

Needle cast:	Past damage:	Host type:	Surveyor	57
Heavy <u> </u>	25% <u> </u>	25% <u> </u>		
Light <u> </u>	50% <u> </u>	50% <u> </u>	Date	56
None <u> </u>	75% <u> </u>	75% <u> </u>		PD
	100% <u> </u>	100% <u> </u>		NC
				HT

TERMINOLOGY USED IN THE 1957 SPRUCE BUDWORM
GROUND APPRAISAL SURVEY

The following definitions of terms to be used by the Missoula Forest Insect Laboratory in survey guidelines, report forms, and survey summaries are given so that all personnel connected with these surveys may have a clear understanding of their meaning. Many of these definitions presumably are not technically adequate, but they are defined as they will be used in the 1957 survey.

DEFOLIATION--partial or complete loss of foliage resulting from budworm feeding.

GROWTH TIPS--small terminal twigs resulting from development of this year's buds.

HOST TYPE--Douglas-fir and true fir.

STAND--an aggregation of trees occupying a specific area and sufficiently uniform in composition (species), age, arrangement and condition as to be distinguishable from the forest or other growth on adjoining areas.

OVERSTORY--that portion of the tree in a forest stand forming the upper crown cover.

UNDERSTORY--that portion of the trees in a forest stand below the overstory.

LARVAL FEEDING PERIOD--the period after the second instar larvae break hibernation until they pupate; in Region One generally between late May and August 1.

DOMINANT--a species which characterizes the community in its larger aspects, usually preponderant either numerically or in mass effect.

BUDWORM FEEDING--any loss of foliage, either entire needles or parts of needles removed by the budworm for food. Not to be confused with deformed or off-color needles caused by disease or weather.

DEGREE OF DEFOLIATION SEVERITY:

LIGHT--Aerial surveys; budworm defoliation in the upper one-eighth of crown barely visible to visible.

Ground surveys; that area in which from twenty-five to fifty percent of the new growth tips have been fed upon during the last larval feeding period.

MEDIUM OR MODERATE--Aerial surveys; defoliation visible throughout the upper one-quarter of the tree crown.

Ground surveys; that area in which fifty-one to seventy-four percent of the new growth tips have been fed upon during the last larval feeding period.

HEAVY--Aerial surveys; areas with more than one-quarter of the tree crown visibly damaged.

Ground surveys; that area in which over seventy-five percent of the new growth tips have been fed upon during the last larval feeding period.